
Intel
Developer
Forum
Spring 2002
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Processing in the Network

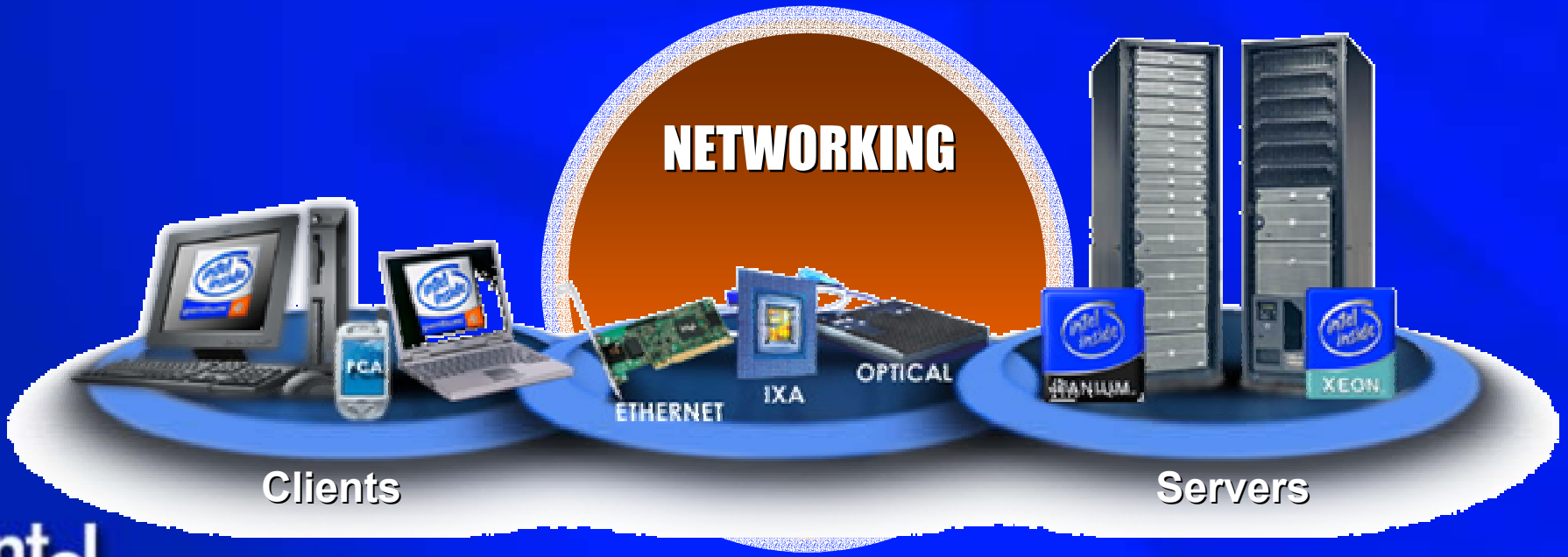
Tom Franz
Vice President & General Manager
Network Processing Group

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Intel Developer Forum
Spring 2002

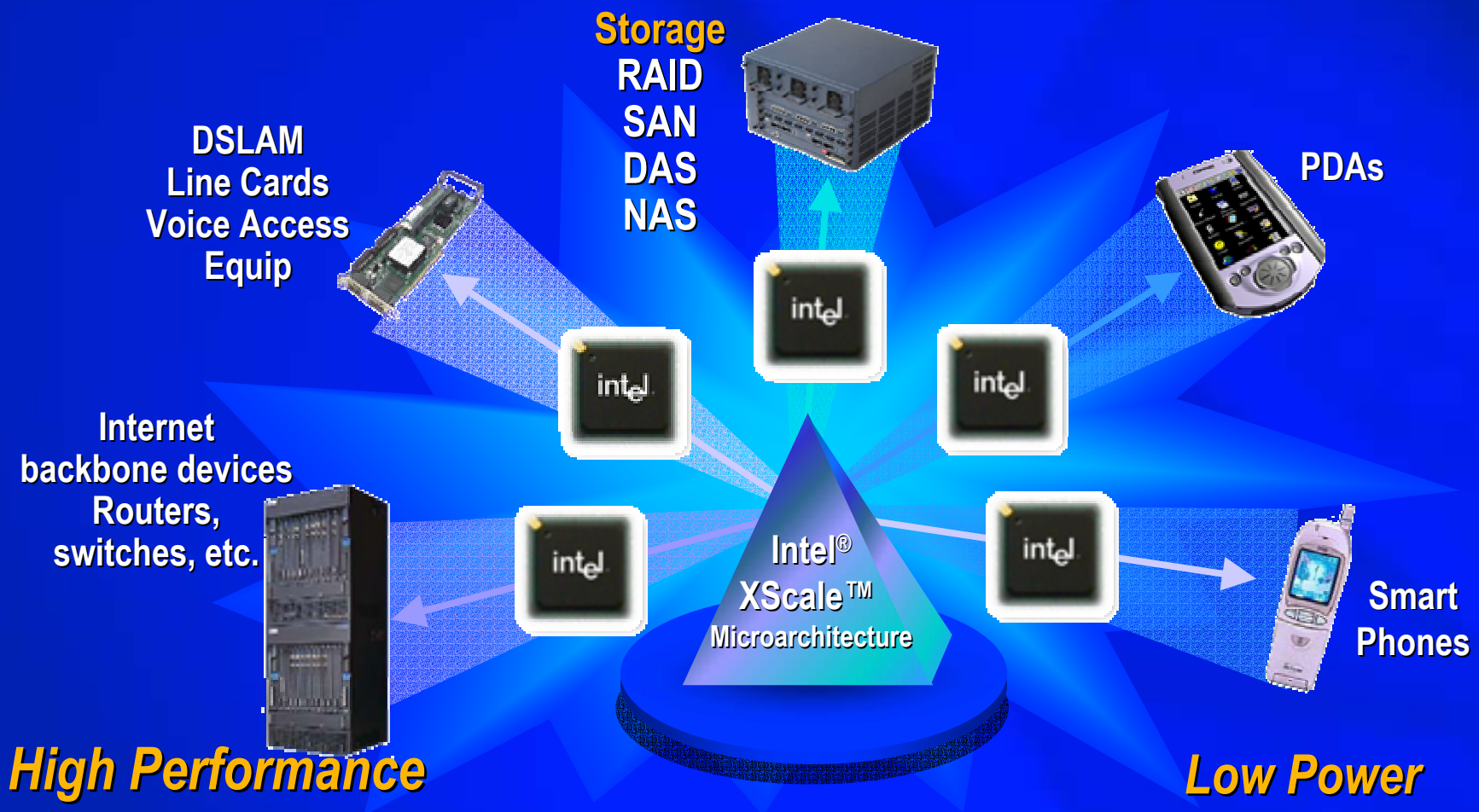
Agenda

- Intel® XScale™ Technology
- I/O Processors
- Network Processors



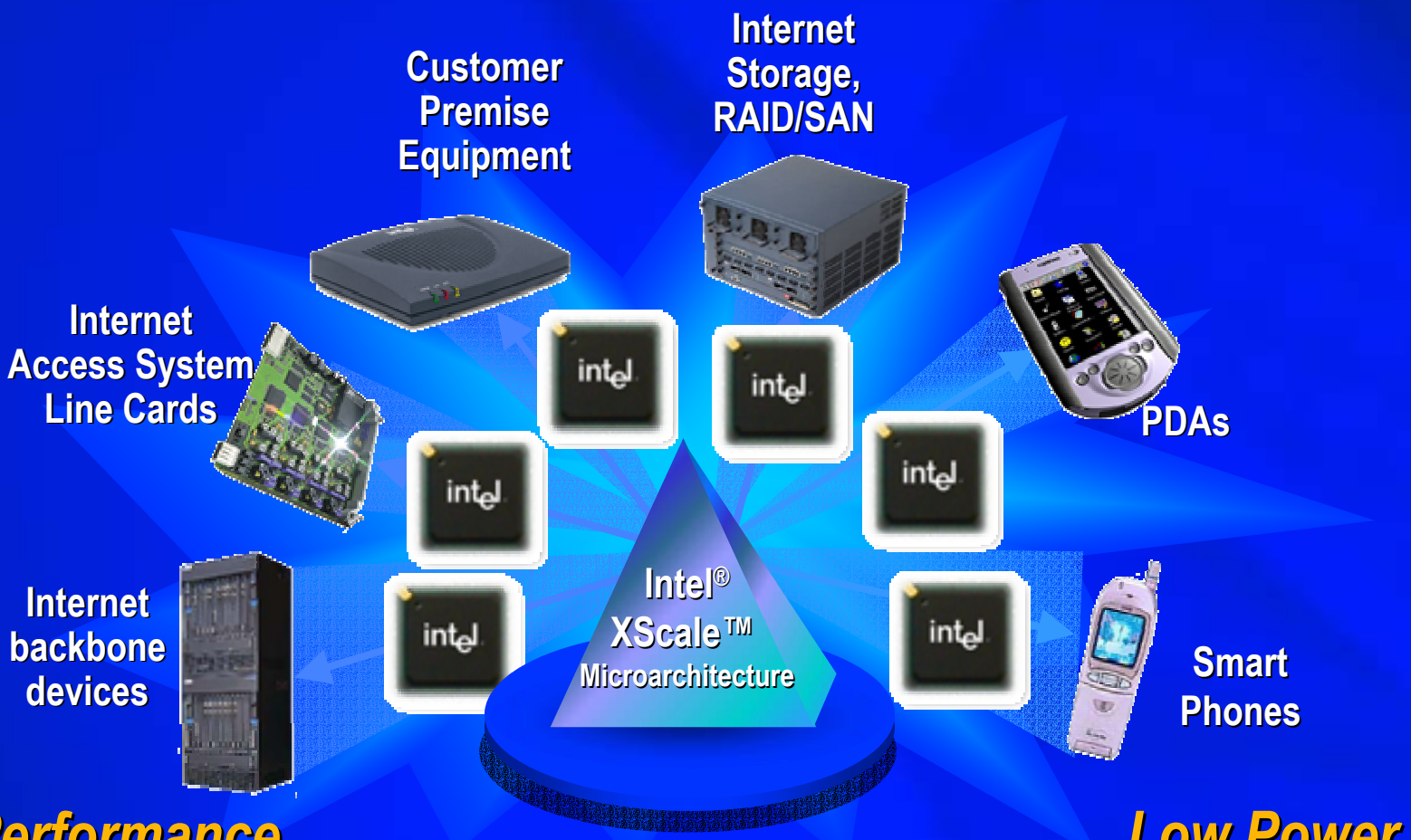
Intel® XScale™ Microarchitecture

Processing in the Network (Circa 2000)



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Delivering Intel® XScale™ Microarchitecture Solutions

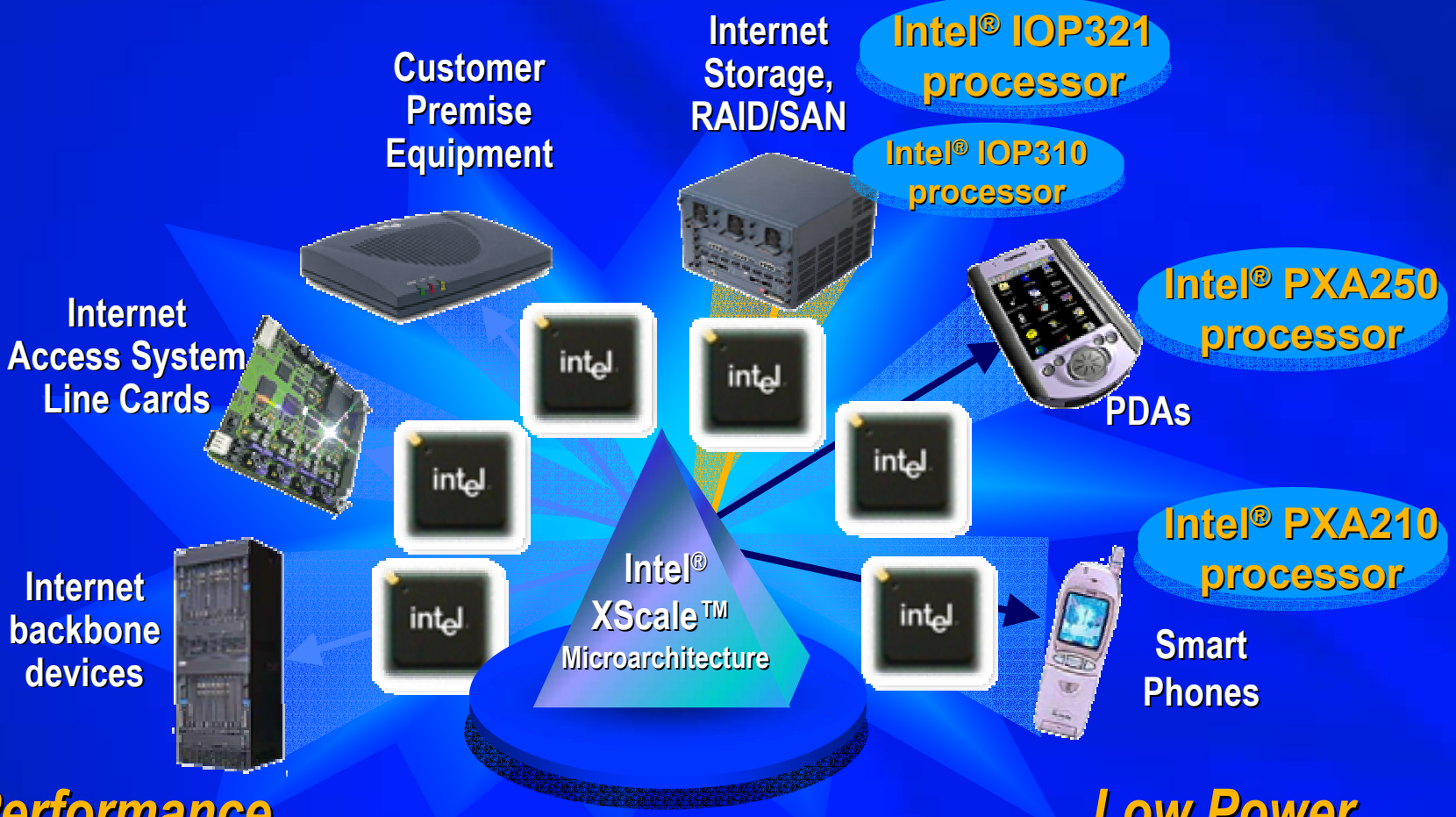


Delivering Intel® XScale™ Microarchitecture Solutions



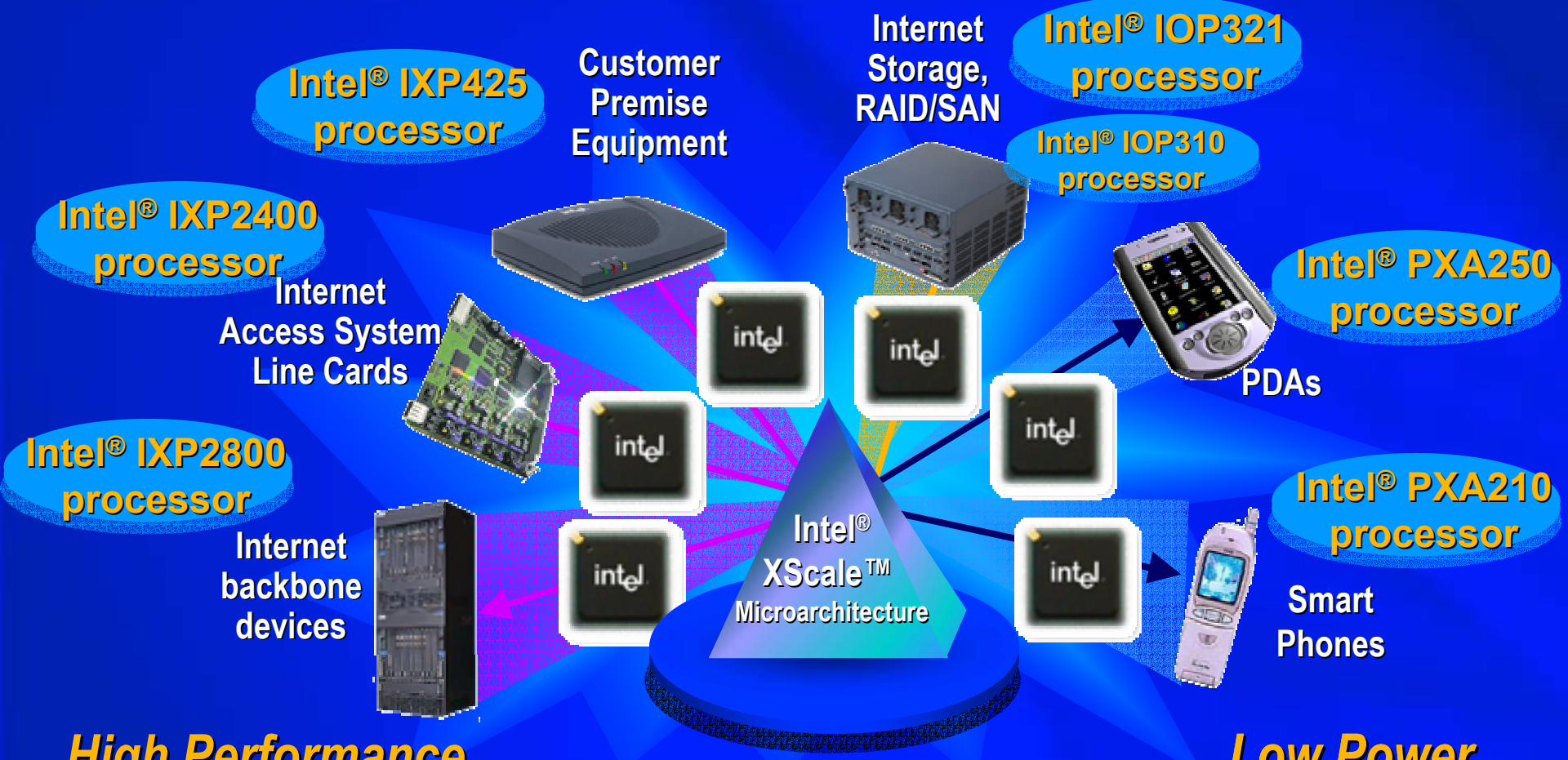
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Delivering Intel® XScale™ Microarchitecture Solutions

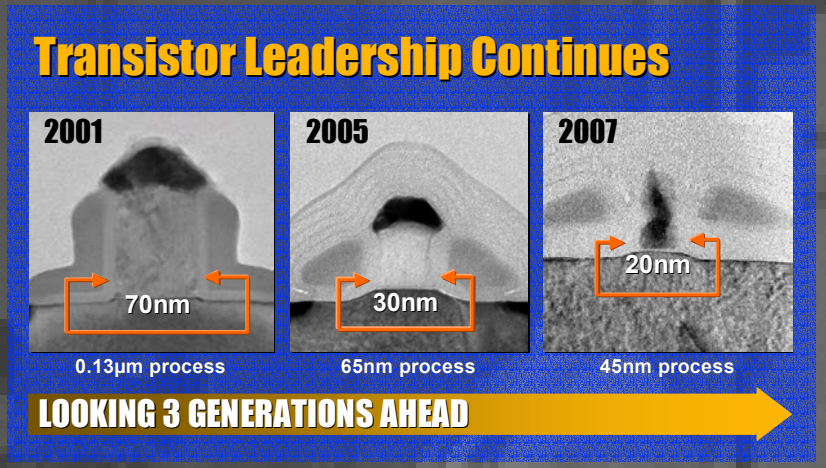


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Delivering Intel® XScale™ Microarchitecture Solutions



Power of Process Technology



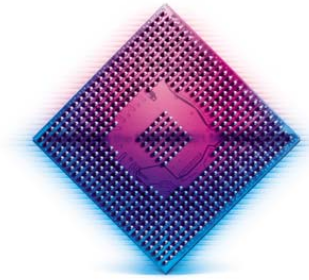
- $13B CAPEX over 2 years
- First to market with leading edge process
- Tuned for high performance with low power

Built in Intel's 0.13-micron process technology, the new chip's full-custom packet engines operate at a jaw-dropping 1.4GHz, several times faster than any other announced NPU.

– Linley Gwennap, Analyst

Intel® IOP321 I/O Processor
with Intel XScale™ Microarchitecture

- 600 MHz Intel XScale Core:
 - 3X overall performance increase*
- Latest PCI-X Bus Interface: 133 MHz/64-bit
 - Double the bandwidth of existing PCI implementations
- Consumes 40% less power*
- Requires 36% less board space*



Intel® IOP321 I/O Processor

- Code compatible with Intel® IOP310 I/O Processor Chipset
- 600 MHz Processor Core
- 133MHz PCI-X Interface
- PC200 DDR Memory Controller
- 32-bit Local Bus

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* Versus Intel® IOP303: current solution for platform integration.

Intel® IOP321 I/O Processor
with Intel XScale™ Microarchitecture

Delivering Intelligence to Networked Storage Applications



- Increased memory and bus interface bandwidth
 - Keeps pace with new disk interconnects (S-ATA, U320, 2GB FC)

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Intel® IOP321 I/O Processor
with Intel XScale™ Microarchitecture

Delivering Intelligence to Networked Storage Applications







- Reduced power and board space
 - Enables low-cost/size NAS and ROMB designs

- Increased memory and bus interface bandwidth
 - Keeps pace with new disk interconnects (S-ATA, U320, 2GB FC)

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Intel® IOP321 I/O Processor
with Intel XScale™ Microarchitecture

Delivering Intelligence to Networked Storage Applications



- **Reduced power and board space**
 - Enables low-cost/size NAS and ROMB designs



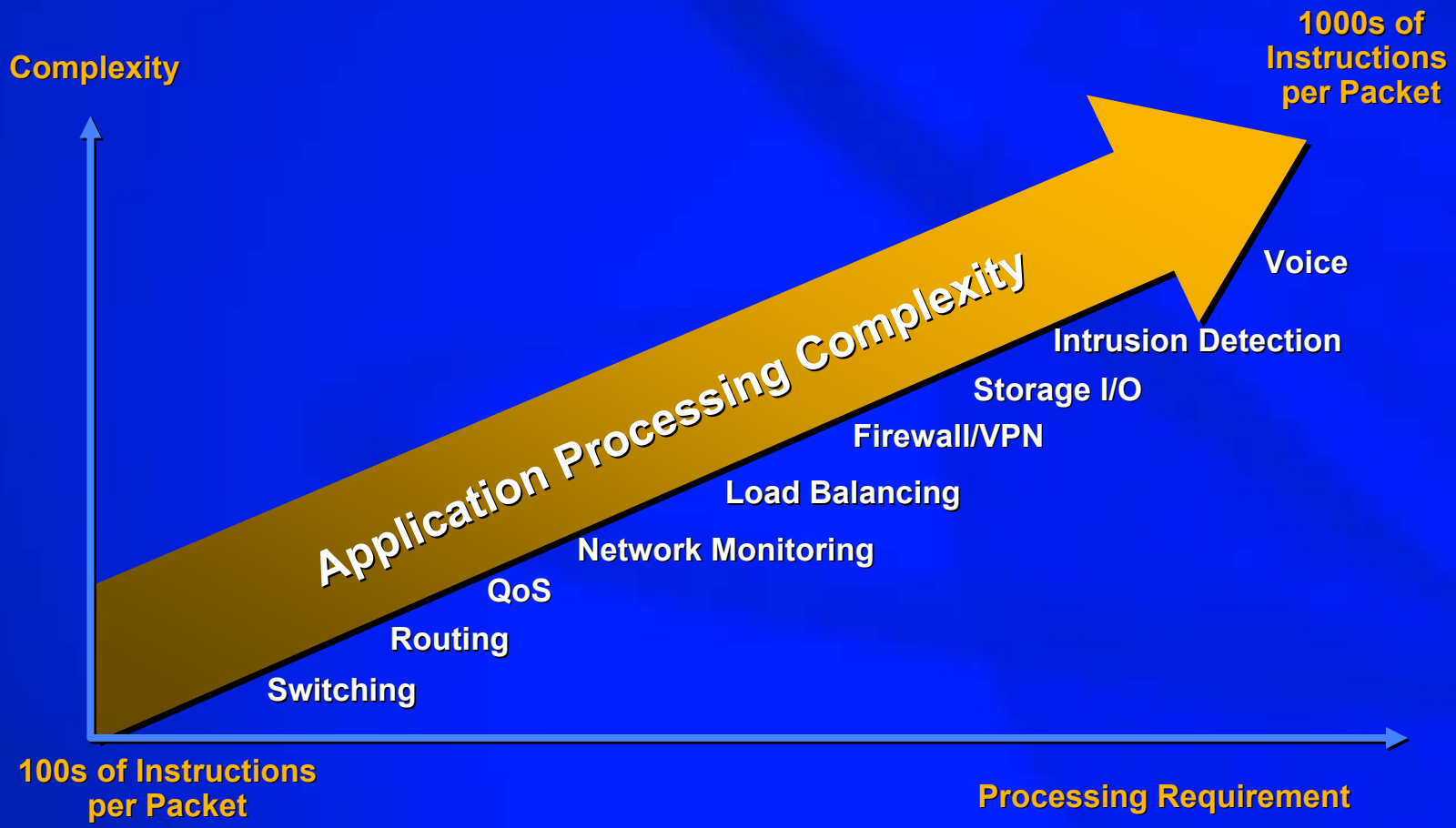




- **Increased memory and bus interface bandwidth**
 - Keeps pace with new disk interconnects (S-ATA, U320, 2GB FC)
- **High processing power for networked storage**
 - Offloads RAID processing from host

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Processing in the Network



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Introducing the Next Generation Intel Network Processors



Intel IXP425 Processor



Intel IXP2400 Processor



Intel IXP2800 Processor

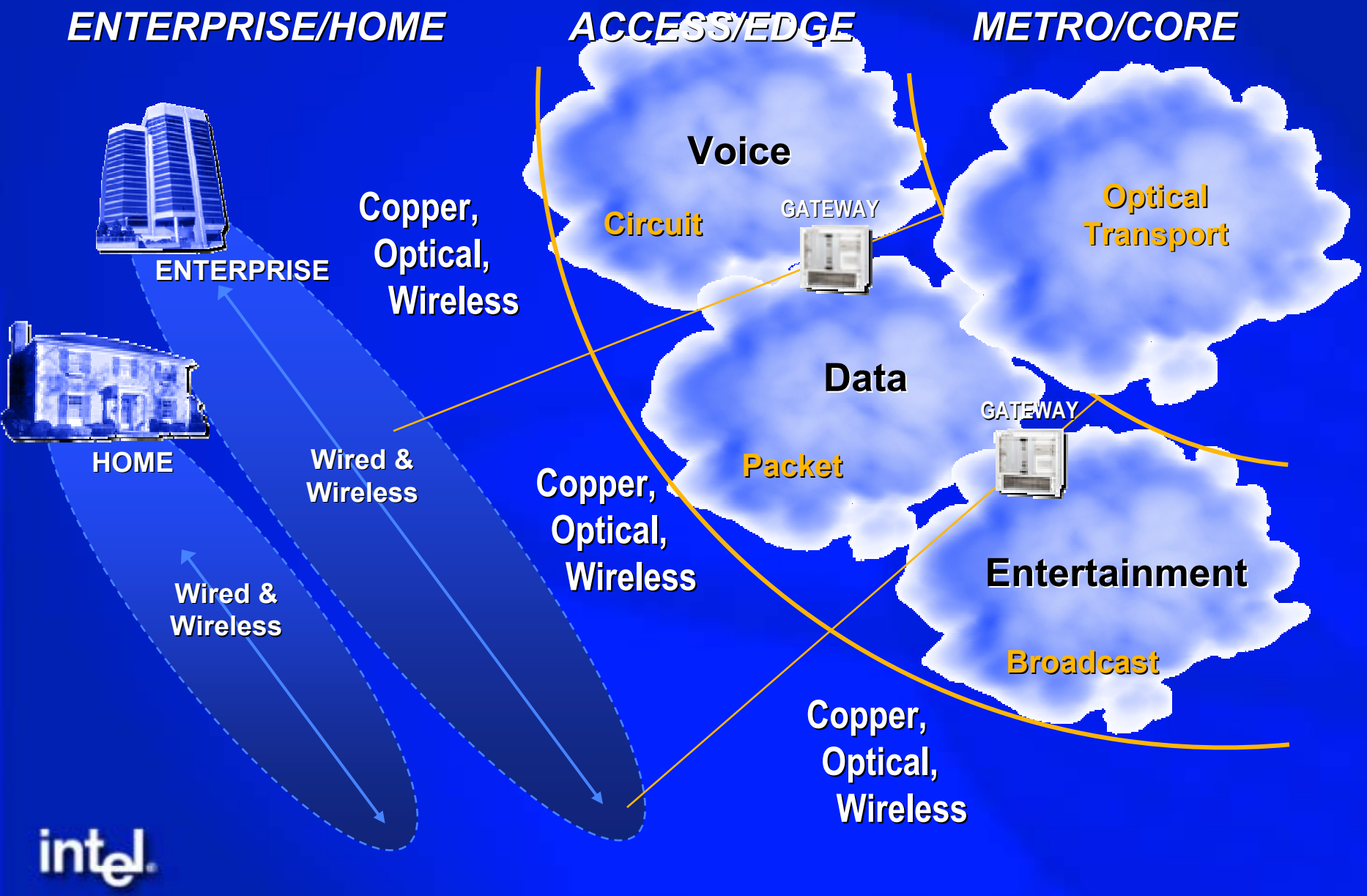




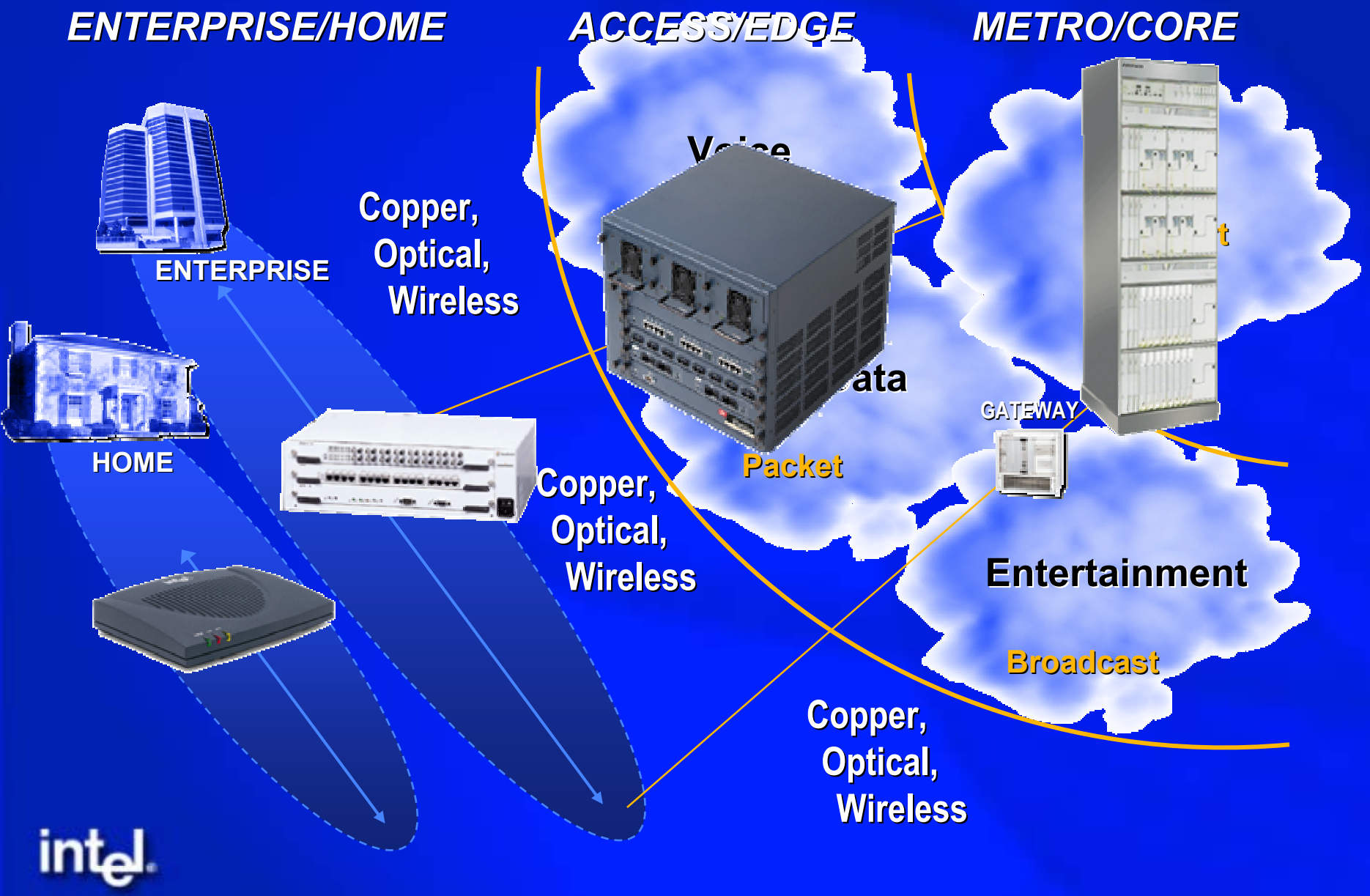


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Modular Network Topology

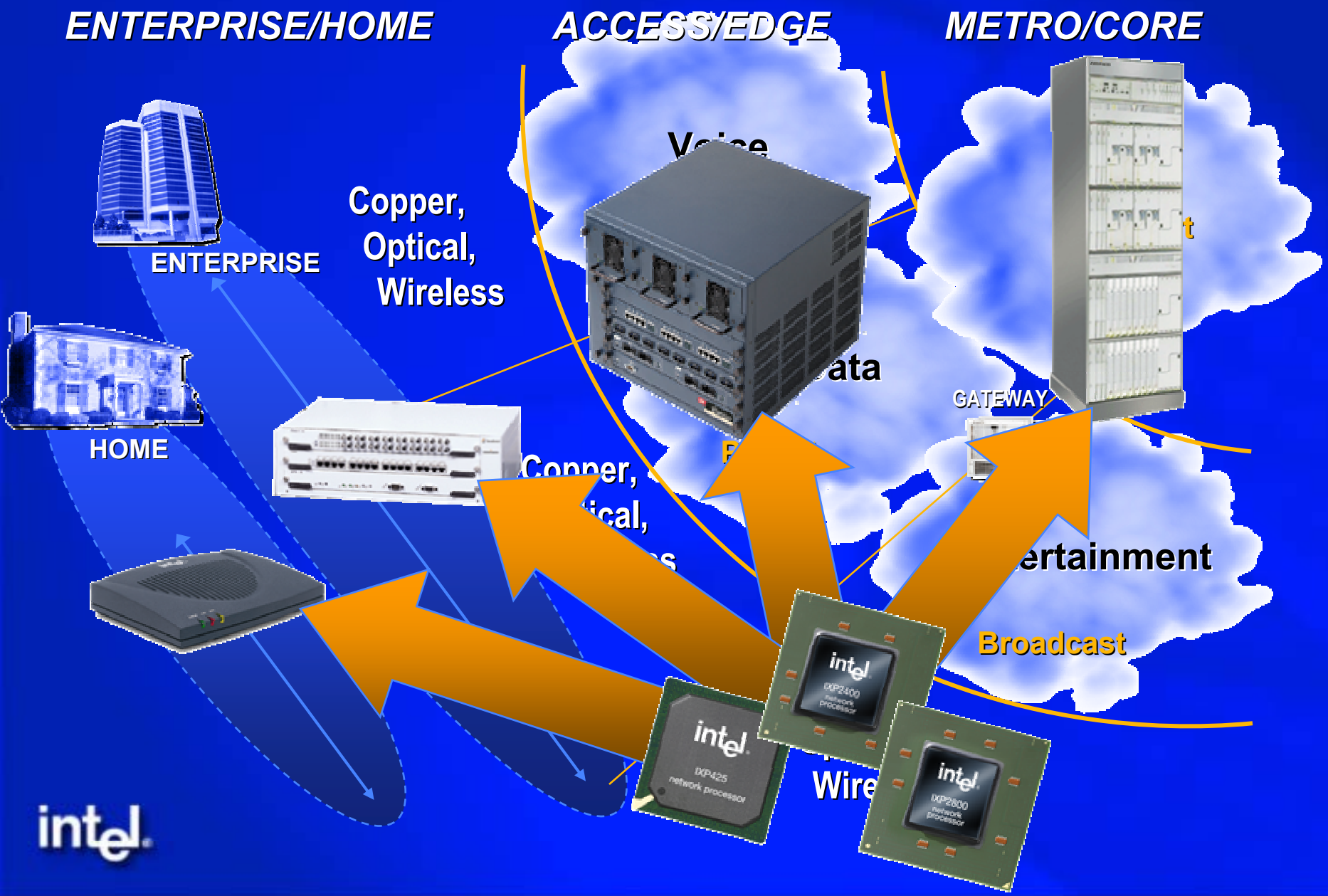


Modular Network Topology



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Modular Network Topology



Introducing the Next Generation Intel Network Processors



Intel IXP425 Processor



- XScale™ core at 533MHz
- 3 packet offload engines
- Integrated Voice Compression
- Integrated LAN, WAN and USB Interfaces

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Introducing the Next Generation Intel Network Processors



Intel® IXP2400 Processor

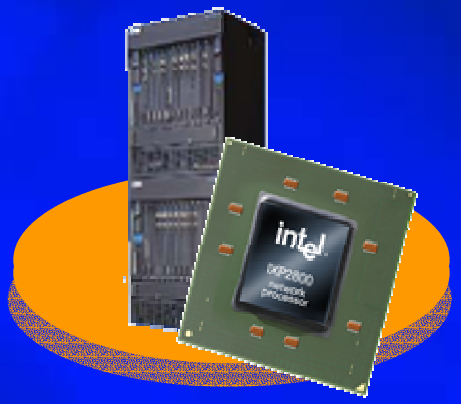


- Eight Gen-2 microengines at 600MHz
- XScale™ core at 600MHz
- 3x processing power of the IXP1200 at the same price
- Pentium® 4 processor process technology
- Industry Standard Interfaces

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Introducing the Next Generation Intel Network Processors

- Sixteen Gen-2 Microengines at 1.4GHz
- XScale™ core at 700MHz
- 25 Billion instructions per second
- 60 Million “store and forward” operations per second
- HyperTask Chaining
- Tuned 0.13 micron process technology



Intel IXP2800 Processor



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Introducing the Next Generation Intel Network Processors



Intel IXP425 Processor

533 MHz

3 Network Processor Engines

Voice processing

Security accelerators

2x Ethernet, 1x Utopia 2

PCI & USB



Intel IXP2400 Processor

600 MHz

8 Microengines

19 Gbps Memory BW

7 M pps L4 processing

2 QDR SRAM channels

1 DRAM channel

10 Watts



Intel IXP2800 Processor

1.4 GHz

16 Microengines

51 Gbps Memory BW

30 M pps L4 processing

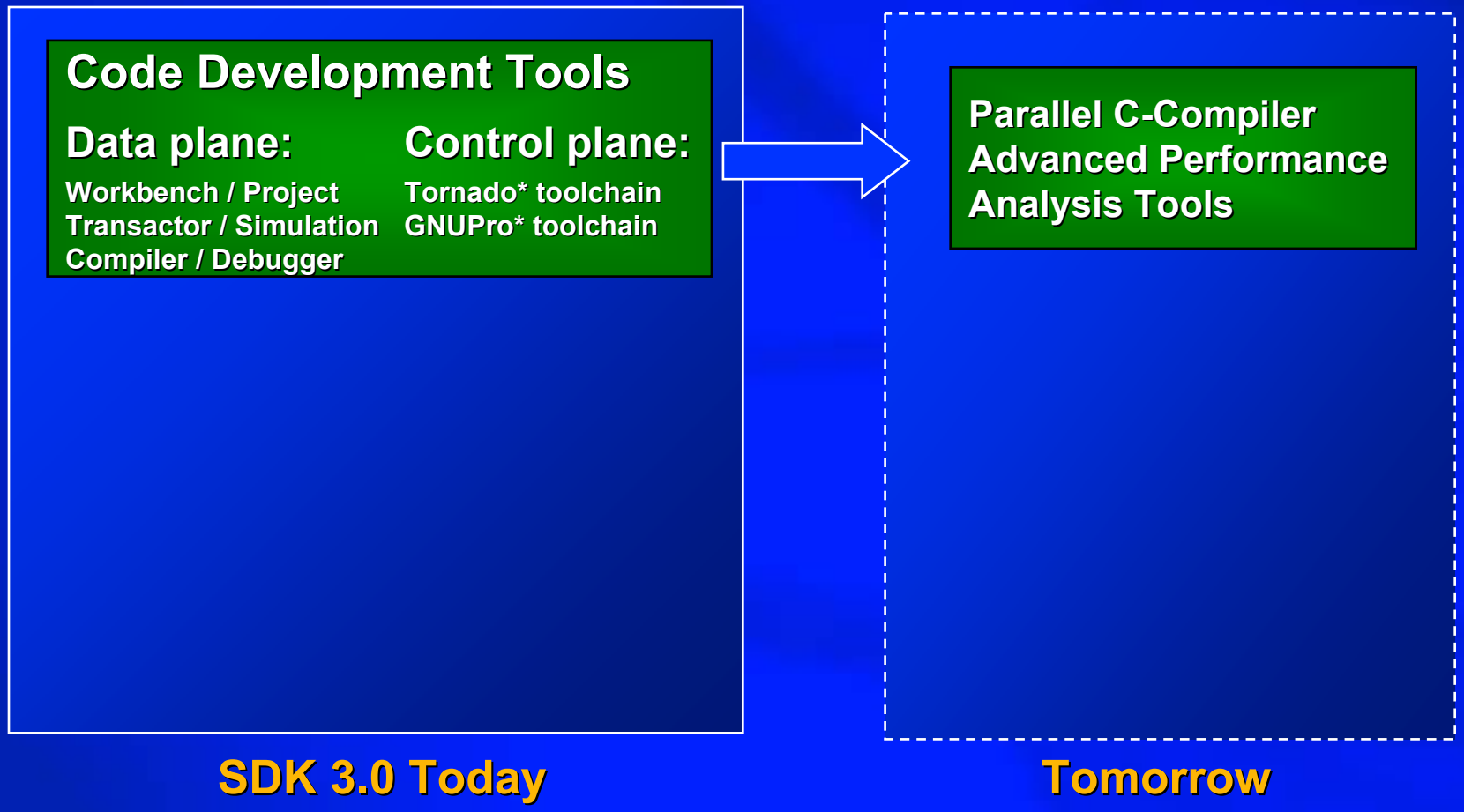
4 QDR SRAM channels

3 DRAM channels

14 Watts

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IXA Software Development Kit Components

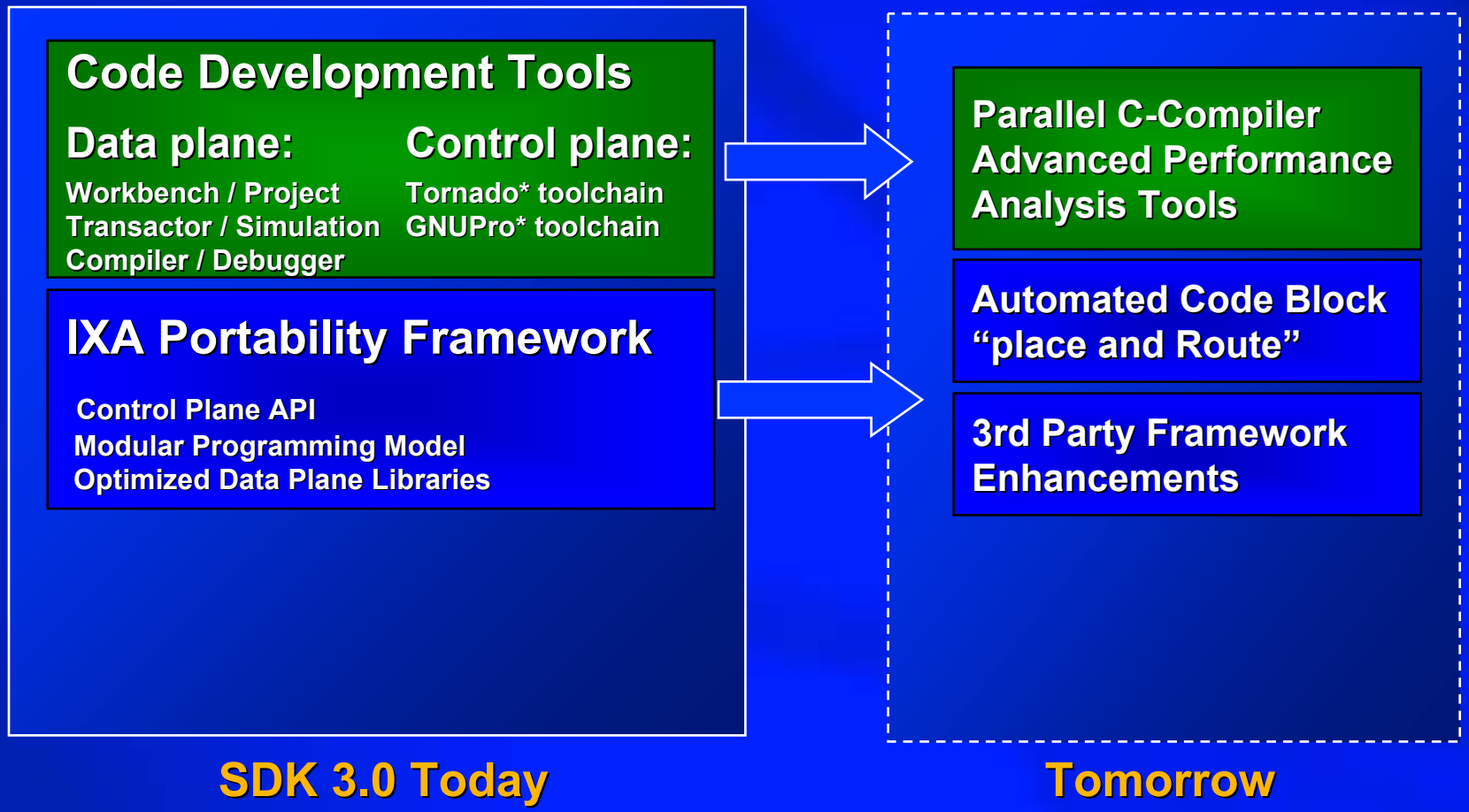


Built on technology from the IXP1200 and Intel Architecture

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* Third-party products

IXA Software Development Kit Components

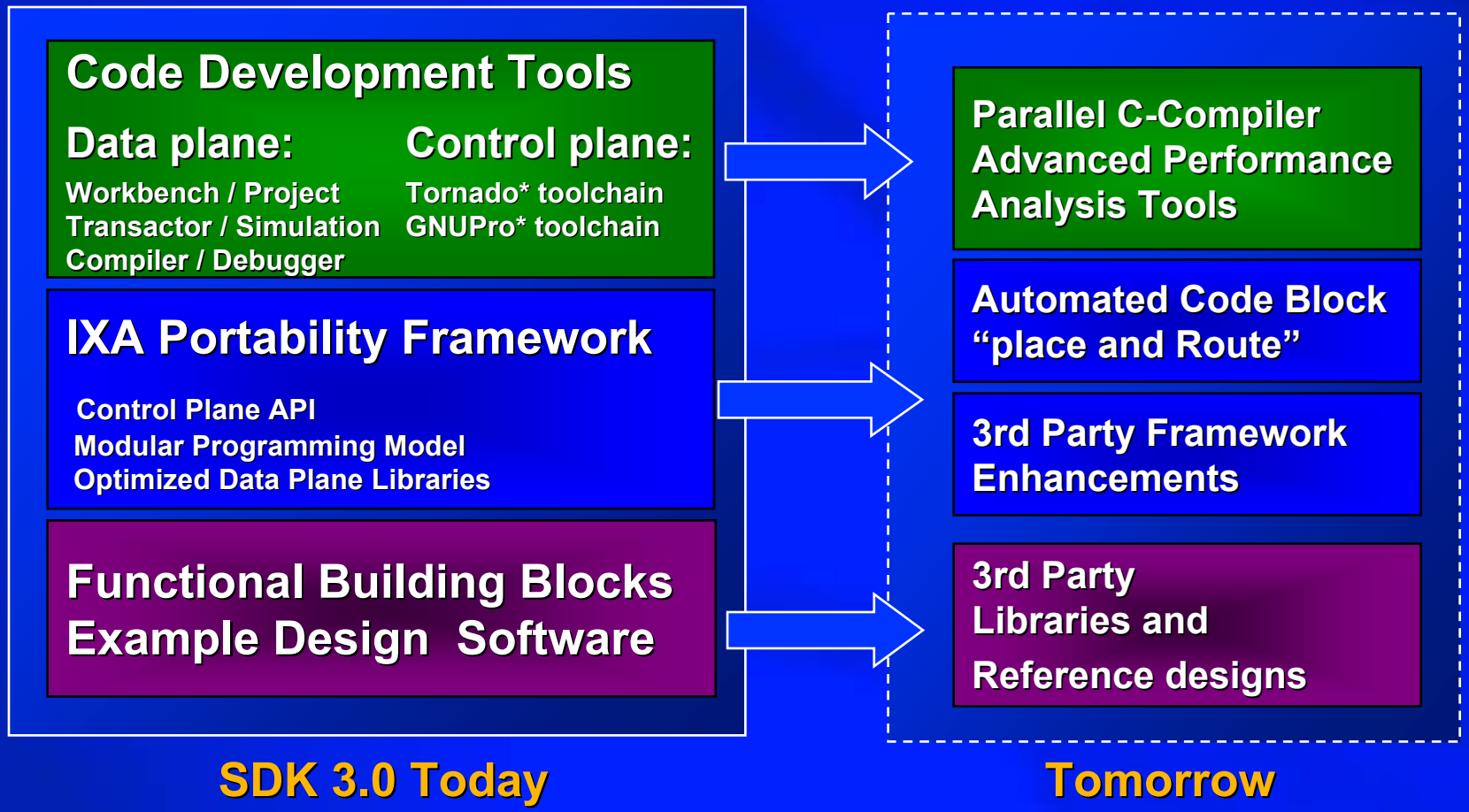


Built on technology from the IXP1200 and Intel Architecture

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* Third-party products

IXA Software Development Kit Components



Built on technology from the IXP1200 and Intel Architecture

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* Third-party products

Fixed Function vs. Programmable

Classification ICs Fixed Functions

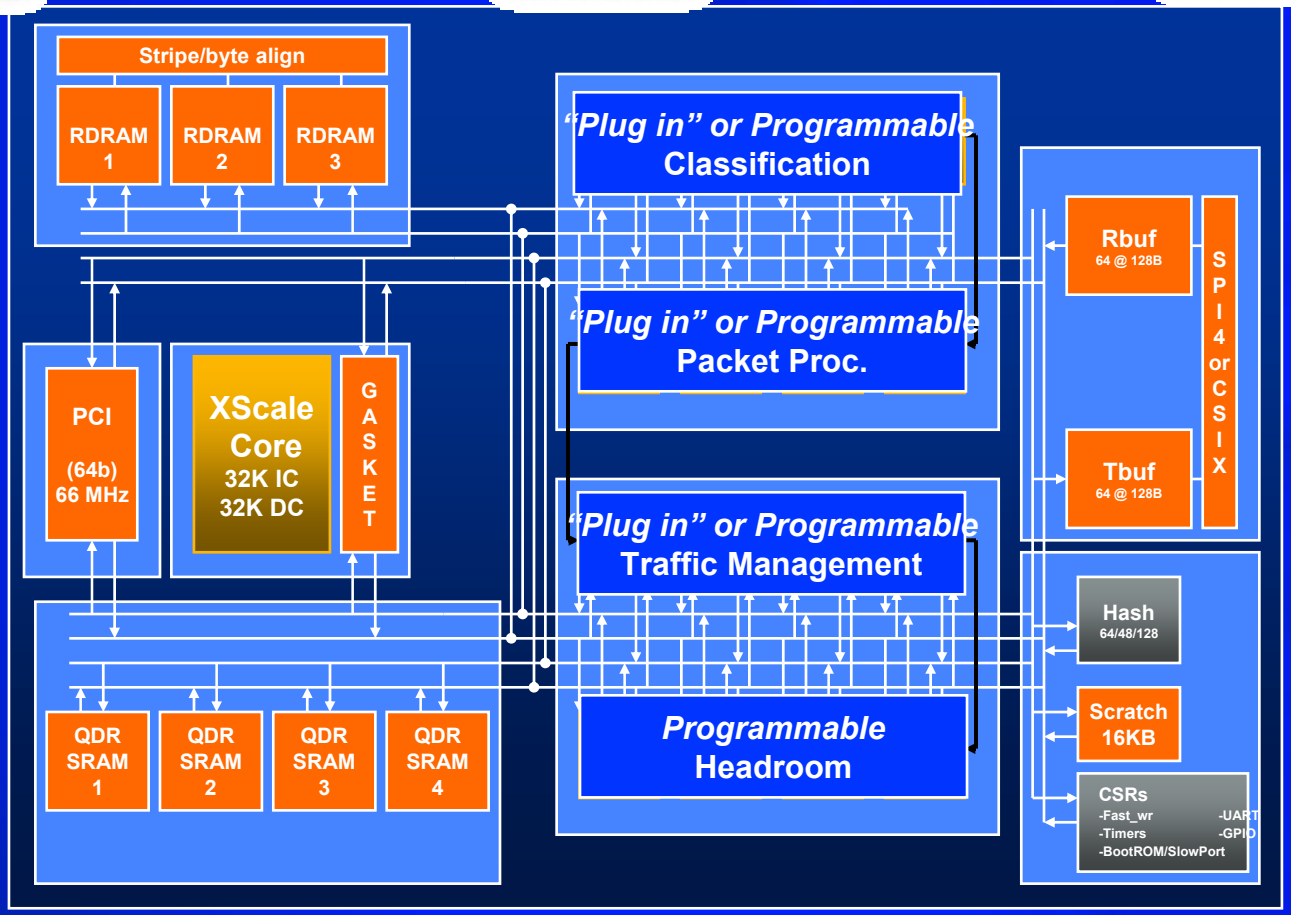
Off Chip Delay

Packet Processing ICs

Off Chip Delay

Traffic Management ICs Fixed Functions

IXP2000 Family



DEMO

Fixed Function vs. Programmable

Classification ICs Fixed Functions

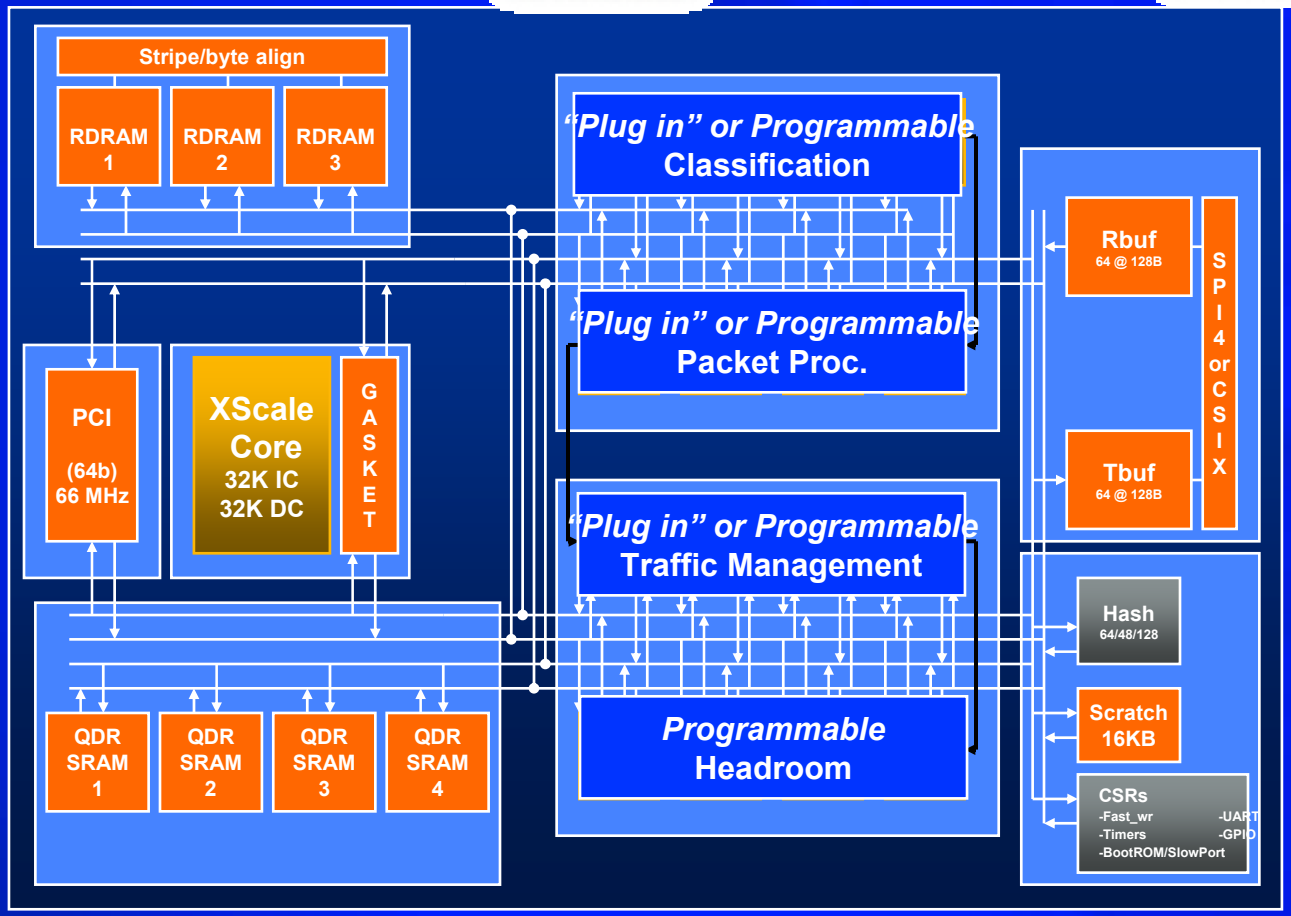
Off Chip Delay

Packet Processing ICs

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Traffic Management ICs Fixed Functions

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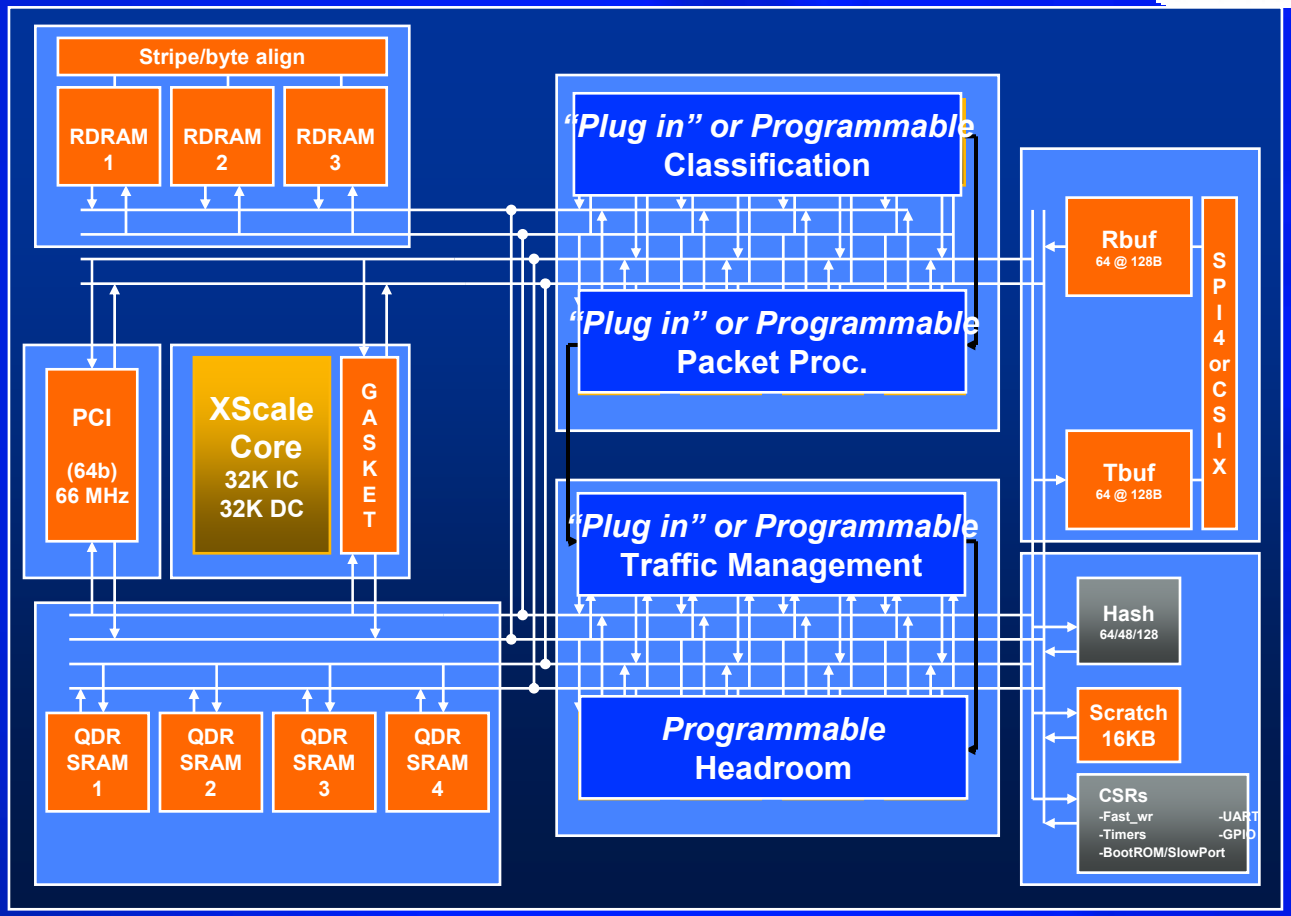
Off Chip Delay

Packet Processing ICs

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Traffic Management ICs Fixed Functions

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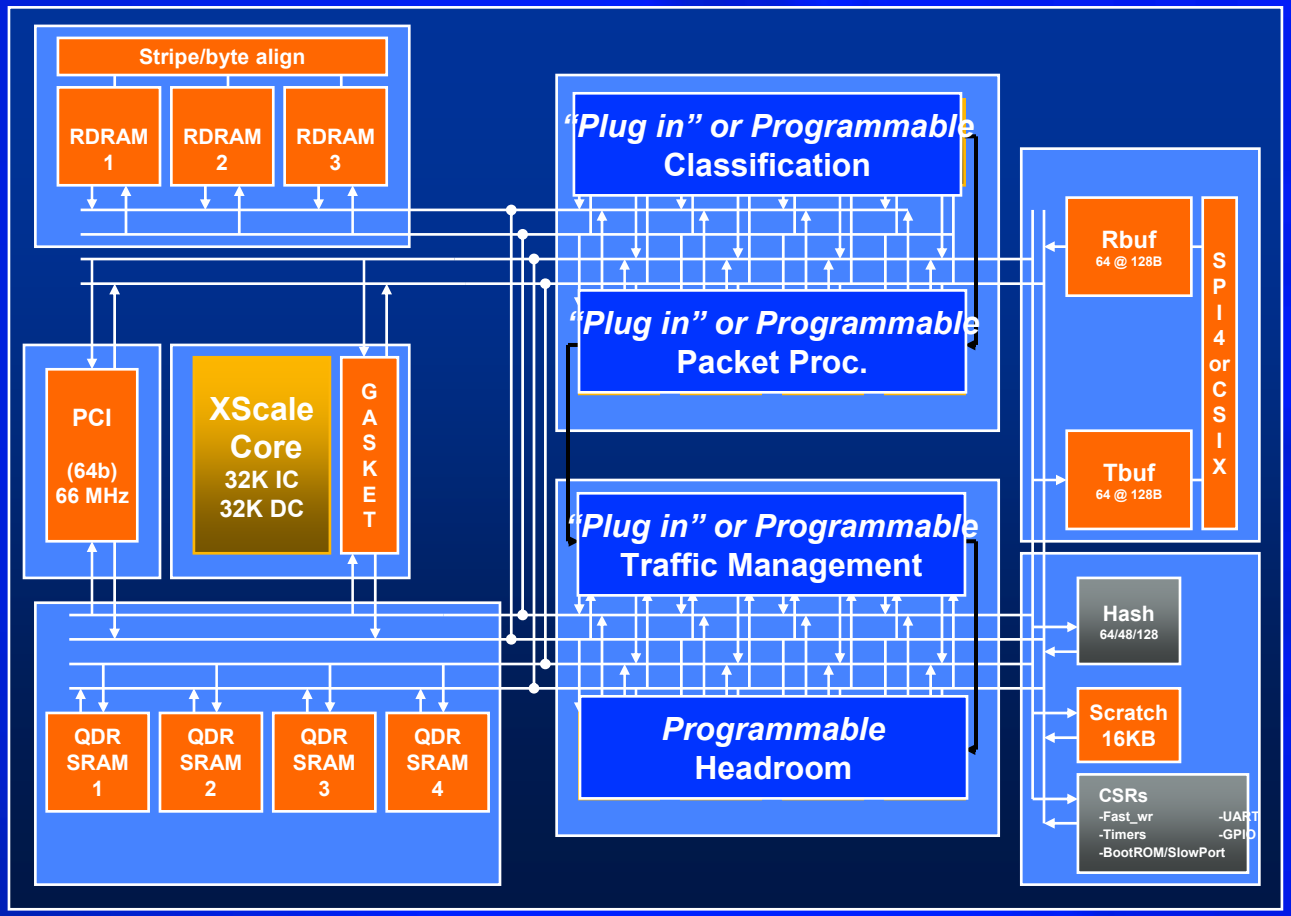
Packet Processing ICs

Traffic Management ICs Fixed Functions

Off Chip Delay

Off Chip Delay

IXP2000 Family



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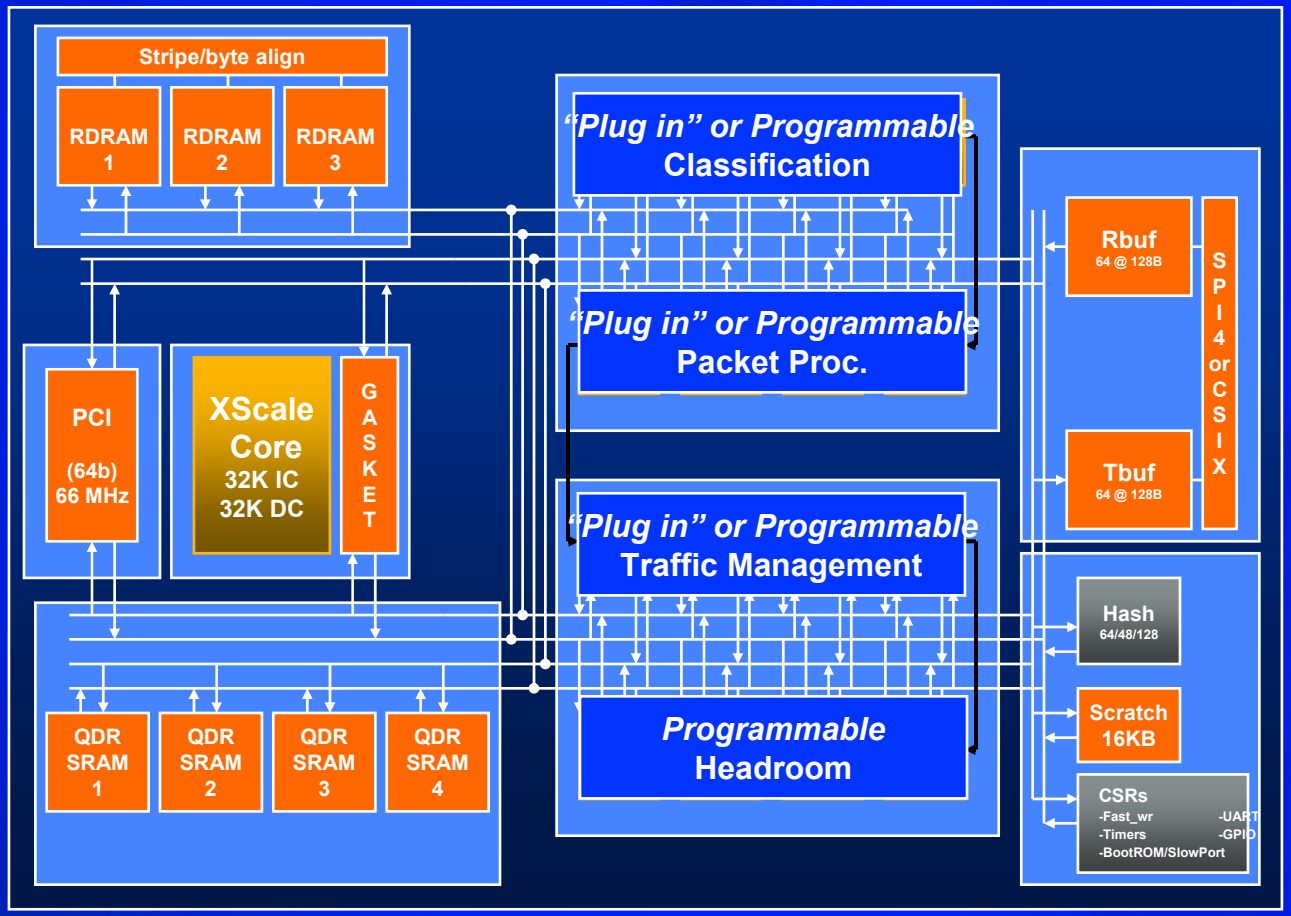
Fixed Function vs. Programmable

Classification ICs Fixed Functions

Packet Processing ICs

Traffic Management ICs Fixed Functions

IXP2000 Family

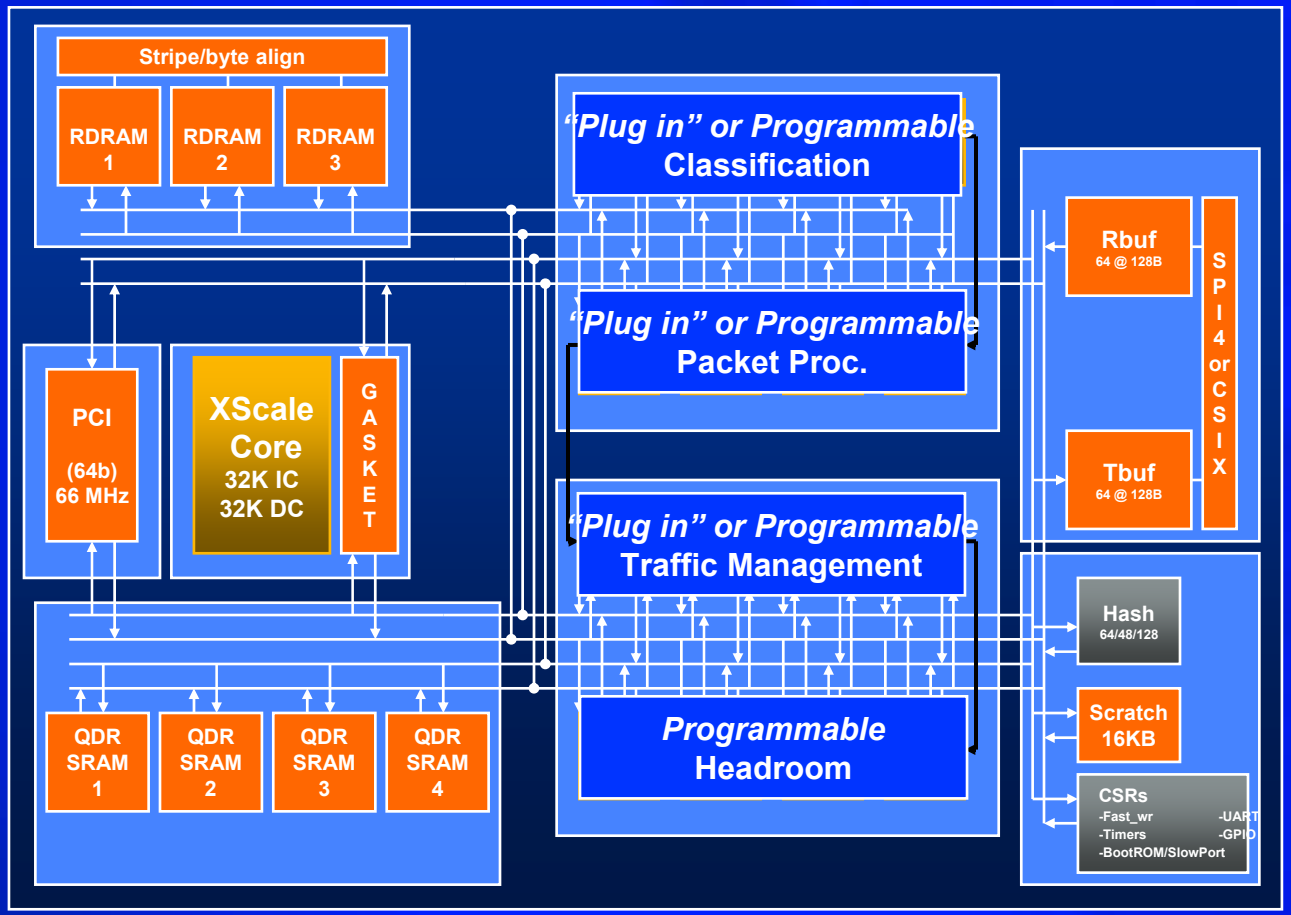


DEMO

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Fixed Function vs. Programmable

IXP2000 Family



DEMO

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Hyper-Task-Chaining (HTC)

- Network Function = Task0 + Task1 + … + Task n
- Function Characteristics determine chaining technique:
 - Function Chaining: multiple tasks work on the same packet
 - Context Chaining: multiple tasks work with the same control structure on different packets
- Hyper-Task-Chaining Provides ease of use for BOTH function chaining and context chaining
- Hyper-Task-Chaining allows seamless interaction of chaining techniques & ripple free s/w enhancements

HTC Unleashes the Power of Network Processors Using World Class Tools

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IXP2800 Reference Design



10Gbps Line Rate

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IXP2800 Reference Design



10Gbps Line Rate

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Intel IXA Developer Network

Intel® Internet Exchange Architecture

Developer Network

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Intel IXA Developer Network

Intel® Internet Exchange Architecture
Developer Network

Silicon and Reference Designs



























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Intel® Internet Exchange Architecture Developer Network

Silicon and Reference Designs

Hifn — Intelligent Secure Networking
NetOctave
IDT — Powering What's Next™
sandburst
TeraCross
ZettaCom — Powering Tomorrow's Network
Altera
NetLogic Microsystems
Power X Networks
Fast-Chip
Solidum
RadiSys
SiberCore Technologies — Silicon Solutions for Cyberspace

Operating Systems, Software, and Development Tools

MontaVista Software
QNX
WindRiver
LynuxWorks
ipinfusion™
Silicon & Software Systems
Teja — More networking. Less work.
EPI
WIPRO — Applying Thought
OCDemon — Macraigor Systems
consystant
Applied Microsystems Corporation

Announcing ecosystem products today for the new IXA family!

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Summary

- Intel investing for the future in communications
- Intel meets the need for speed
- Intel delivers on processing in the network

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